LAB II EXPERIMENTATION REPORT ON TRAINING A DETECTRON2 MODEL ON A CUSTOM DATASET

1. INTRODUCTION

We experiment in depth the custom dataset preparation and training on the Detectron2. The nut dataset consists of 3 classes; datae, fig, and hazelnut with instance masks annotation.

2. DATA VISUALIZATION

These are samples of randomly selected training set of the nut dataset.

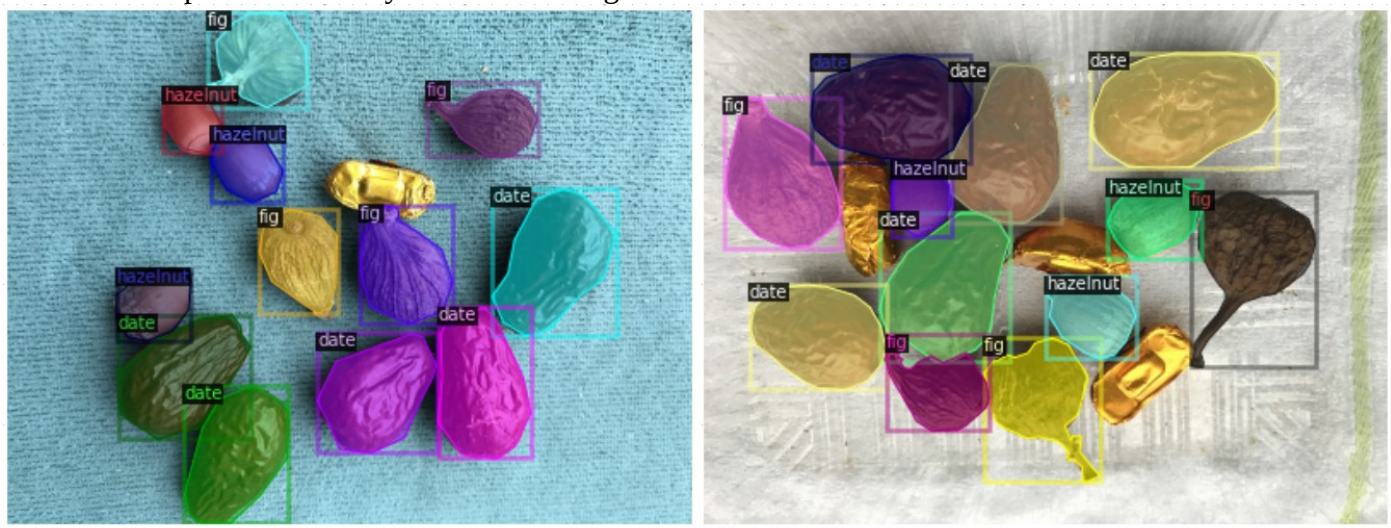

Fig 1: Visualization of randomly selected samples in the training set

3. TRAINING CURVES

Running 300 iterations with an initialized learning rate of 0.02, 2images per batc and 128 regions per batch we trained on the COCOinit (it uses the COCO pre-trained weights) and ININit (it uses the ImageNet pre-trained weight) models. The training curves for the mask_rcnn and total loss for both models is given below:

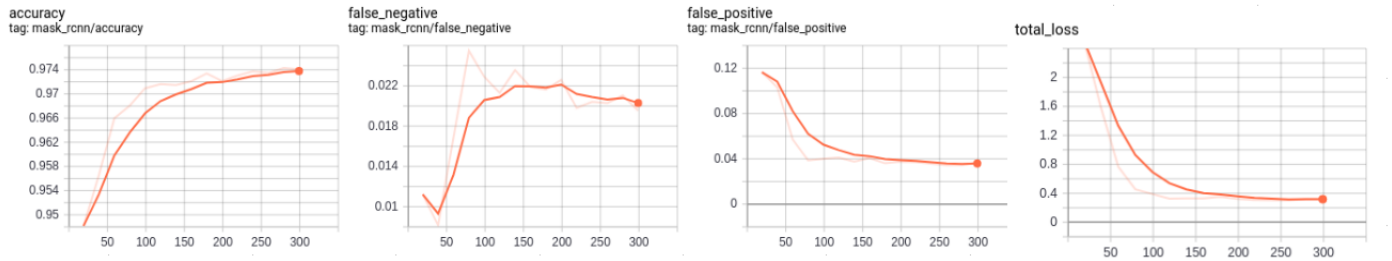

Fig 1b: Tensorboard mask_rcnn and total_loss curves for the COCOinit model

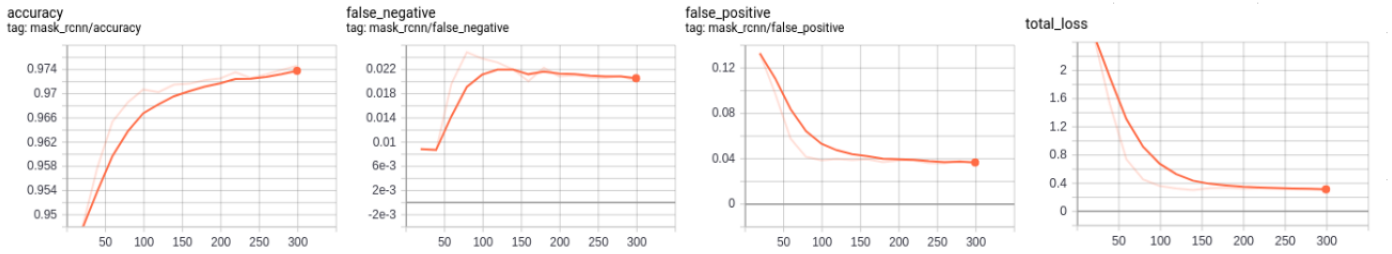

Fig 1b: Tensorboard mask_rcnn and total_loss curves for the ININit model

4. VISUALIZATIONS OF PREDICTIONS

These are visualizations of the prediction of the trained models of COCOinit and ININit on the validation dataset.

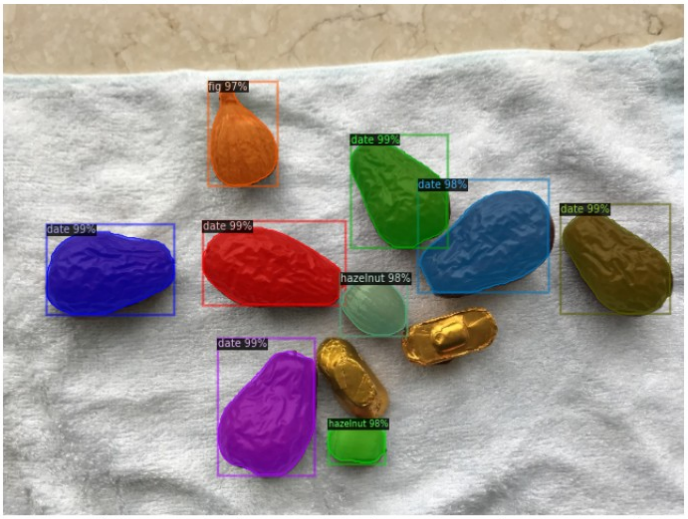

Fig 2a: Prediction visualization of Image 4 in the validation set on the COCOinit Model

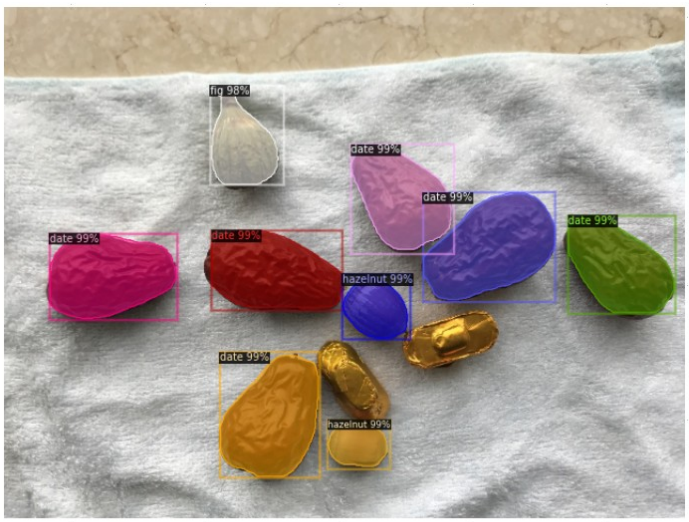

Fig 2b: Prediction visualization of Image 4 in the validation set on the ININit Model

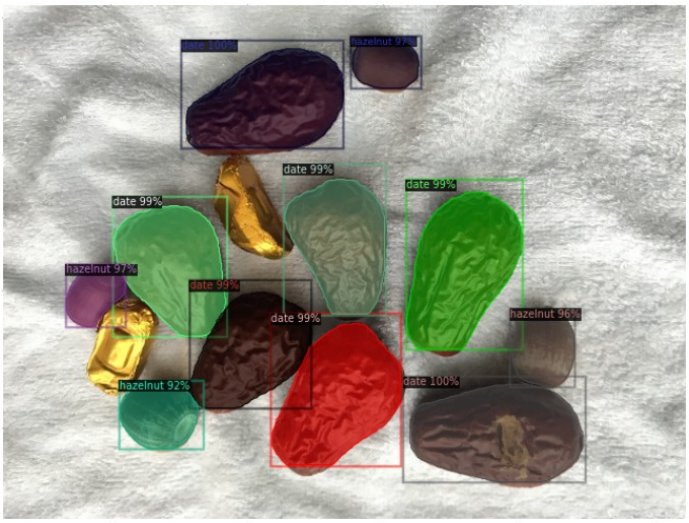

Fig 2c: Prediction visualization of Image 5 in the validation set on the COCOinit Model

Fig 2d: Prediction visualization of Image 5 in the validation set on the ININit Model

5. EVALUATION

The tables below showed the evaluation metrics of the COCO api for both COCOinit and ININit models respectively. Comparing the evaluated average precision for box and segmentation per-category indicates that ININit model performed best with reported overall of 85.913 and 90.452 on both task which due to model complexity of the ImageNet on the dataset.

	Average Precision	
Category	Per-Category Box	Per-Category Segmentation
Date	84.364	95.157
Fig	78.416	88.886
Hazelnut	81.457	90.017

Table 1: Evaluation result of the COCOinit model

	Average Precision	
Category	Per-Category Box	Per-Category Segmentation
Date	90.452	96.271
Fig	82.673	91.386
Hazelnut	84.613	91.624

Table 2: Evaluation result of the ININit model

6. REFERENCES

- Georgia Gkioxari, Advanced Course in Computer Vision, AMMI Rwanda/Ghana, 2020
- Justin Johnson, Deep Learning for Computer Vision | Object Detection and Segmentation, University of Michigan, USA, 2019
- https://github.com/facebookresearch/Detectron
- https://github.com/Tony607
- https://github.com/gkioxari/aims2020_visualrecognition/releases/download/v1.0/nuts.zip